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SYSTEMSMEASUREMENT  
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DEVICESLASER  
MARKERS

Related Information

■ General terms and conditions..... P.1

■ Sensor selection guide .... P.11~ / P.833~

■ Glossary of terms / General precautions...P.1019 / P.1027

■ About laser beam.....P.1025~

SUNX website <http://www.sunx.com>CE  
Conforming to  
EMC DirectiveUL  
RecognitionFDA  
Conforming to  
FDA regulations  
(ANR11□□1 and  
ANR12□□1 only)

This product is classified as a Class 1 / Class 2 Laser Product in IEC / JIS standards and a Class II Laser Product in FDA regulations. Do not look at the laser beam directly or through optical system such as a lens.

## The LM10 makes laser sensors super easy to use!

### High-precision measurements, comparative output (amount of light / displacement) function

In addition to conventional analog output, it is equipped with standard ON / OFF control output (single / double comparator) enabling its use as a photoelectric sensor. It is compatible for "micro-spotting" and "high-precision" applications normally reserved for lasers.

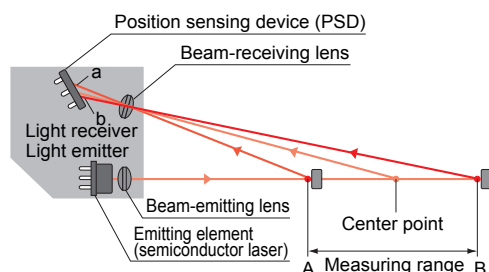
#### Setting modes and types of ON / OFF control

Type	Standard mode	Intensity mode
Window comparator	Distance judgment (3 value output)	No mode setting
Single comparator	Distance judgment (2 value output)	Intensity judgment (2 value output)

Distance judgment: ON / OFF control on the basis of distance measurement.  
Intensity judgment: ON / OFF control on the basis of received light level.

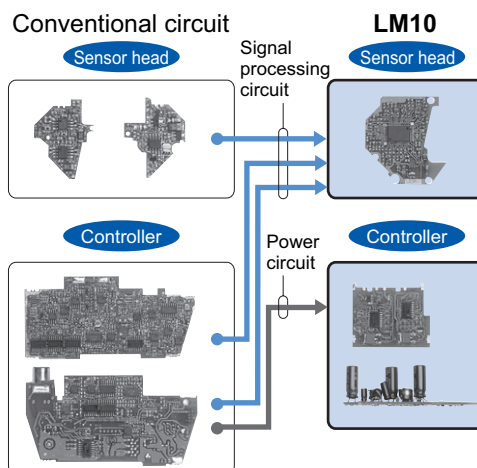
#### Measurement principle of LM10 (optical triangulation)

Part of the light rays which come from the target object by means of diffuse reflection produce a light spot on the position sensing device (PSD). This light spot varies depending on the displacement of the target object. By measuring the fluctuations in the light spot, **LM10** can measure the distance of the target object.

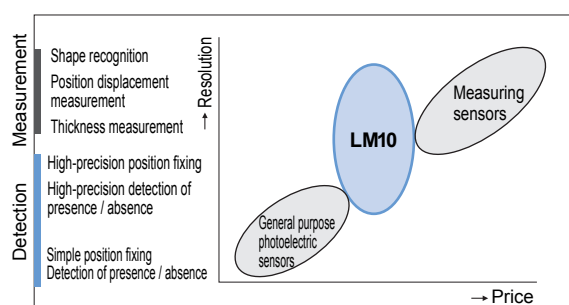


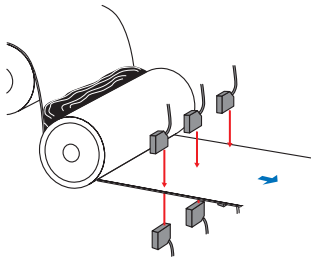
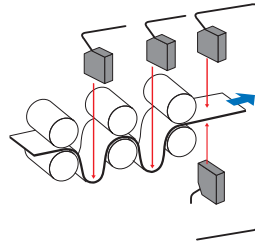
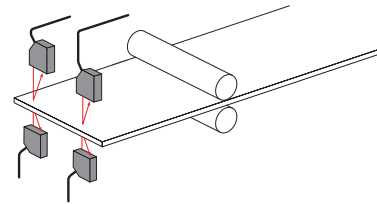
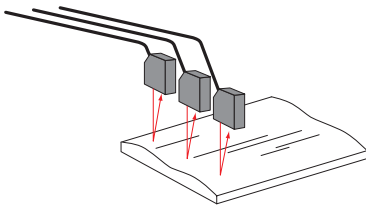
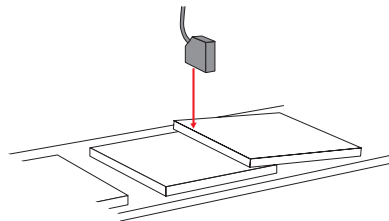
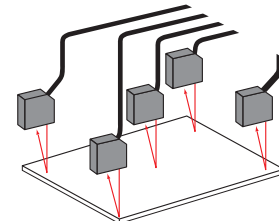
### New circuitry lowers costs

**LM10** uses the single-channel IC, which reduces the dual-channel processing requirement of conventional products to a single channel. Building the arithmetic circuits into the IC has made it possible to reduce costs.



### The LM10's cost-performance ratio far outstrips the competition



ORDER GUIDE  
P.859SPECIFICATIONS  
P.860~I/O CIRCUIT DIAGRAMS  
P.862SENSING CHARACTERISTICS  
P.863~PRECAUTIONS FOR PROPER USE  
P.865DIMENSIONS  
P.866**APPLICATIONS****Measuring packing-tape thickness****Slack detection****Measuring board thickness****Wood surface form detection****Construction material overlap detection****Asymmetry detection**FIBER  
SENSORSLASER  
SENSORSPHOTOELECTRIC  
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PHOTOELECTRIC  
SENSORSAREA  
SENSORSSAFETY  
COMPONENTSPRESSURE  
SENSORSINDUCTIVE  
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SENSORSPARTICULAR  
USE SENSORSSENSOR  
OPTIONSWIRE-SAVING  
SYSTEMSMEASUREMENT  
SENSORSSTATIC CONTROL  
DEVICESLASER  
MARKERS**BASIC PERFORMANCE****Use LM10 with confidence. It meets for Class 1 laser safety (IEC standards)**

In addition to our laser Class 2 products, a full line of Class 1 products have been added. Development of a high-precision aspheric surface plastic lens has made it possible to maintain both high precision and Class 1 safety. The visible light spot makes it easy to see and safe to use.

**Globally usable**

This micro laser sensor **LM10** comply with the requirements of the relevant EC Directives (CE marking). Not only can they work well in devices made for European industry but also possess enhanced electromagnetic environment performance making them safe to use. For the controller's comparative output, in addition to the NPN transistor output, the PNP transistor output is also available.

**VARIETIES****Interchangeable sensor heads**

18 models of sensor heads and 4 models of controllers can be freely combined in 72 different ways. Unlike with conventional sensors, these heads and controllers are completely interchangeable to meet any type of measuring and processing requirements, so there is no need for pair management of heads and controllers.

**Excellent in the following circumstances...****• When carrying out repairs**

Suppose an accident on the production line damages the sensor head.



**With the micro laser displacement sensor LM10...**



...all you have to do is replace the sensor head. As long as there is a spare sensor available, the problem can be solved without stopping the production line.

**• When changing to a different model**

Suppose that after purchasing the sensor it becomes necessary to switch to a different model due to changes in the object you are measuring.



**With the micro laser displacement sensor LM10...**



...all you have to do is buy a new sensor head. The current controller need not be replaced.

Selection  
GuideLaser  
Displacement**HL-C2****HL-C1****LM-10**Magnetic  
Displacement**GP-X****GP-A**Collimated  
Beam Sensors**HL-T1****LA-300****LA**Other  
Products

## ORDER GUIDE

### Sensor heads

Laser class	Type	Measuring range	Resolution	Spot diameter	Model No.	
					IEC standards conforming type	FDA regulations conforming type
Class 1	<b>LM10-50</b>	50 ± 10 mm <b>1.969 ± 0.394 in</b>	5 μm <b>0.197 mil</b>	0.6 × 1.1 mm <b>0.024 × 0.043 in</b>	ANR1150	ANR11501
	<b>LM10-50S</b>	50 ± 10 mm <b>1.969 ± 0.394 in</b>	5 μm <b>0.197 mil</b>	0.09 × 0.05 mm <b>0.004 × 0.002 in</b>	ANR1151	ANR11511
	<b>LM10-80</b>	80 ± 20 mm <b>3.150 ± 0.787 in</b>	20 μm <b>0.787 mil</b>	0.7 × 1.2 mm <b>0.023 × 0.047 in</b>	ANR1182	ANR11821
	<b>LM10-130</b>	130 ± 50 mm <b>5.118 ± 1.969 in</b>	100 μm <b>3.937 mil</b>	0.7 × 1.4 mm <b>0.028 × 0.055 in</b>	ANR1115	ANR11151
Class 2	<b>LM10-50</b>	50 ± 10 mm <b>1.969 ± 0.394 in</b>	1 μm <b>0.039 mil</b>	0.6 × 1.1 mm <b>0.024 × 0.043 in</b>	ANR1250	ANR12501
	<b>LM10-50S</b>	50 ± 10 mm <b>1.969 ± 0.394 in</b>	1 μm <b>0.039 mil</b>	0.09 × 0.05 mm <b>0.004 × 0.002 in</b>	ANR1251	ANR12511
	<b>LM10-80</b>	80 ± 20 mm <b>3.150 ± 0.787 in</b>	4 μm <b>0.157 mil</b>	0.7 × 1.2 mm <b>0.028 × 0.047 in</b>	ANR1282	ANR12821
	<b>LM10-130</b>	130 ± 50 mm <b>5.118 ± 1.969 in</b>	20 μm <b>0.787 mil</b>	0.7 × 1.4 mm <b>0.028 × 0.055 in</b>	ANR1215	ANR12151
	<b>LM10-250</b>	250 ± 150 mm <b>9.843 ± 5.906 in</b>	150 μm <b>5.906 mil</b>	0.8 × 1.5 mm <b>0.031 × 0.059 in</b>	ANR1226	ANR12261

### Controllers

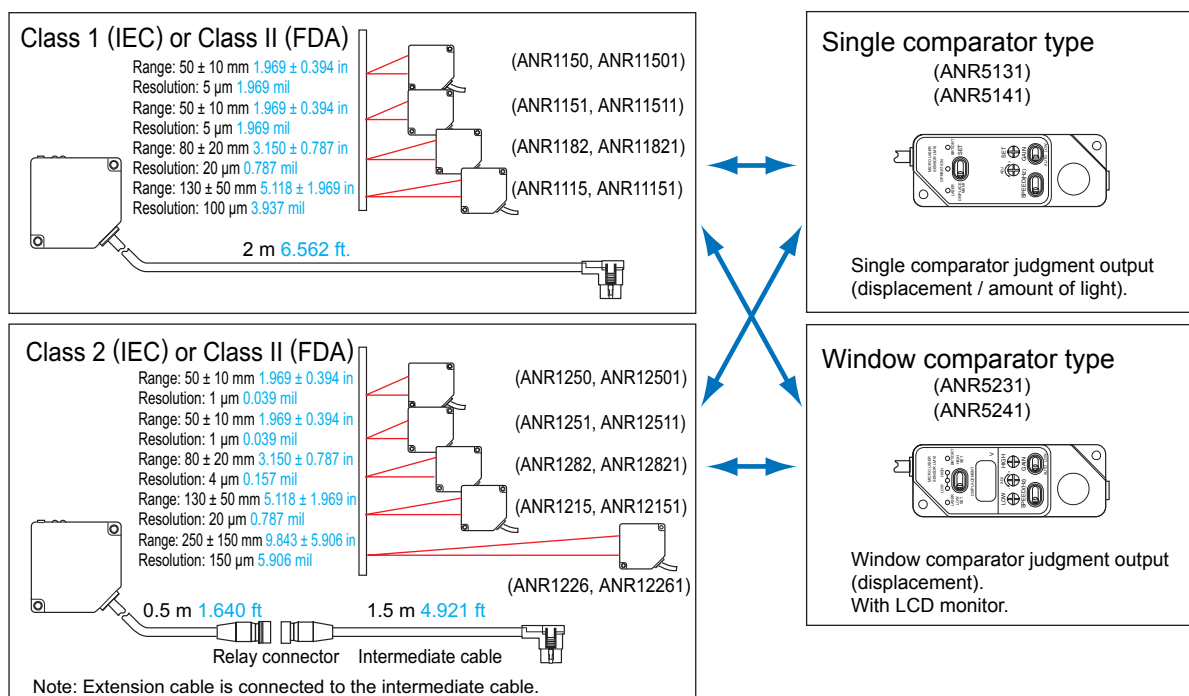
	Output	Specifications	Model No.
Controller	±5 V	Built-in single comparator	ANR5131
		Built-in window comparator	ANR5231
	4 to 20 mA (NPN output)	Built-in single comparator	ANR5141
		Built-in window comparator	ANR5241

Note: NPN and PNP outputs are coordinated as per all the models' comparative outputs.

**Extension cable (for sensor Class 2 types only) for connection to the intermediate cable** (1.5 m **4.921 ft** intermediate cable is supplied with Class 2 type sensor heads)

Designation	Specifications	Model No.
Extension cable (Flexible cable)	2 m <b>6.562 ft</b> cable length	ANR81020
	3 m <b>9.843 ft</b> cable length	ANR81030
	5 m <b>16.404 ft</b> cable length	ANR81050
	8 m <b>26.247 ft</b> cable length	ANR81080
	10 m <b>32.808 ft</b> cable length	ANR81100
	20 m <b>65.617 ft</b> cable length	ANR81200
	30 m <b>98.425 ft</b> cable length	ANR81300

## SENSOR HEAD AND CONTROLLER ASSEMBLY



**SPECIFICATIONS****Sensor heads****Class 1 type**

Item	Model No.	IEC standards conforming type	ANR1150	ANR1151	ANR1182	ANR1115
		FDA regulations conforming type	ANR11501	ANR11511	ANR11821	ANR11151
Measurement center distance			50 mm <b>1.969 in</b>	50 mm <b>1.969 in</b>	80 mm <b>3.150 in</b>	130 mm <b>5.118 in</b>
Measuring range			±10 mm <b>±0.394 in</b>	±10 mm <b>±0.394 in</b>	±20 mm <b>±0.787 in</b>	±50 mm <b>±1.969 in</b>
Light source			Laser diode (Peak emission wavelength: 650 nm <b>0.026 mil</b> )			
Pulse width / Max.output / Laser class			15 μs (Duty 50 %) / 0.4 mW (Peak value) / Class 1 (IEC 60825-1), (Class II for FDA regulations conforming type)			
Beam spot diameter (Representative values from a measurement center distance)			0.6 × 1.1 mm <b>0.024 × 0.043 in</b> approx.	0.09 × 0.05 mm <b>0.004 × 0.002 in</b> approx.	0.7 × 1.2 mm <b>0.028 × 0.047 in</b> approx.	0.7 × 1.4 mm <b>0.028 × 0.055 in</b> approx.
Resolution (2 σ)	10Hz		5 μm <b>0.197 mil</b>	5 μm <b>0.197 mil</b>	20 μm <b>0.787 mil</b>	100 μm <b>03.937 mil</b>
	100Hz		16 μm <b>0.630 mil</b>	16 μm <b>0.630 mil</b>	65 μm <b>2.559 mil</b>	330 μm <b>12.992 mil</b>
	1kHz		50 μm <b>1.969 mil</b>	50 μm <b>1.969 mil</b>	200 μm <b>7.874 mil</b>	1 mm <b>00.039 in</b>
Linearity error (Note 2)			Within ±0.2 % of F.S.			
Protection (excluding connector)			IP67 (IEC) (Refer to p.984 for details of standards.)			
Ambient illuminance (Incandescent lamp)			2,500 lx or less			
Weight (including cable)			Net weight: 300 g approx.			

Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +20 °C **+68 °F**.

2) White ceramics is the target of this value.

**Class 2 type**

Item	Model No.	IEC standards conforming type	ANR1250	ANR1251	ANR1282	ANR1215	ANR1226
		FDA regulations conforming type	ANR12501	ANR12511	ANR12821	ANR12151	ANR12261
Measurement center distance			50 mm <b>1.969 in</b>	50 mm <b>1.969 in</b>	80 mm <b>3.150 in</b>	130 mm <b>5.118 in</b>	250 mm <b>9.843 in</b>
Measuring range			±10 mm <b>±0.394 in</b>	±10 mm <b>±0.394 in</b>	±20 mm <b>±0.787 in</b>	±50 mm <b>±1.969 in</b>	±150 mm <b>±5.906 in</b>
Light source			Laser diode (Peak emission wavelength: 650 nm <b>0.026 mil</b> )				
Pulse width / Max.output / Laser class			15 μs (Duty 50 %) / 1.6 mW (Peak value) / Class 2 (IEC 60825-1), (Class II for FDA regulations conforming type)				
Beam spot diameter (Representative values from a measurement center distance)			0.6 × 1.1 mm <b>0.024 × 0.043 in</b> approx.	0.09 × 0.05 mm <b>0.004 × 0.002 in</b> approx.	0.7 × 1.2 mm <b>0.028 × 0.047 in</b> approx.	0.7 × 1.4 mm <b>0.028 × 0.055 in</b> approx.	0.8 × 1.5 mm <b>0.031 × 0.059 in</b> approx.
Resolution (2 σ)	10Hz		1 μm <b>0.039 mil</b>	1 μm <b>0.039 mil</b>	4 μm <b>0.157 mil</b>	20 μm <b>0.787 mil</b>	150 μm <b>5.906 mil</b>
	100Hz		3.5 μm <b>0.138 mil</b>	3.5 μm <b>0.138 mil</b>	13 μm <b>0.512 mil</b>	65 μm <b>2.551 mil</b>	500 μm <b>19.685 mil</b>
	1kHz		10 μm <b>0.394 mil</b>	10 μm <b>0.394 mil</b>	40 μm <b>1.575 mil</b>	200 μm <b>7.874 mil</b>	1.5 mm <b>0.059 in</b>
Linearity error (Note 2)			Within ±0.2 % of F.S.				Within ±0.4 % of F.S.
Protection (excluding connector)			IP67 (IEC) (Refer to p.984 for details of standards.)				
Ambient illuminance (Incandescent lamp)			3,000 lx or less				2,500 lx or less
Weight			Net weight: Sensor head (including cable): 240 g approx., Intermediate cable: 130 g approx.				

Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +20 °C **+68 °F**.

2) White ceramics is the target of this value.

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OPTIONSWIRE-  
SAVING  
SYSTEMSMEASURE-  
MENT  
SENSORSSTATIC  
CONTROL  
DEVICESLASER  
MARKERSSelection  
GuideLaser  
Displacement**HL-C2****HL-C1****LM10**Magnetic  
Displacement**GP-X****GP-A**Collimated  
Beam Sensors**HL-T1****LA-300****LA**Other  
Products

## SPECIFICATIONS

### Controllers

Model No.	ANR5131	ANR5141	ANR5231	ANR5241
Item				
Comparative output type	Single comparator		Window comparator	
Analog output	±5 V/F.S. (2 mA max.)	4 to 20 mA/F.S. (250 Ω max.)	±5 V/F.S. (2 mA max.)	4 to 20 mA/F.S. (250 Ω max.)
Output impedance	50 Ω	————	50 Ω	————
Zero-point adjustment	Within ±10 % of F.S.			
Temperature drift (Sensor and controller set)	Within ±(0.03 % of F.S.) /°C	Within ±(0.04 % of F.S.) /°C	Within ±(0.03 % of F.S.) /°C	Within ±(0.04 % of F.S.) /°C
Response frequency (–3 dB)	1 kHz / 100 Hz / 10 Hz			
Response time (10 to 90 %)	0.4 ms / 4 ms / 40 ms (Switchable)			
Comparative output (Note 2)	NPN open-collector 2 Nos. (100 mA, 30 V DC or less, residual voltage 1.5 V or less)		NPN open-collector 3 Nos. (100 mA, 30 V DC or less, residual voltage 1.5 V or less)	
Hysteresis	0.15 % of F.S. or less			
Alarm output	NPN open-collector 1 No. (100 mA, 30 V DC or less, residual voltage 1.5 V or less) (Note 2)			
Intensity monitor output	±5 V			
Comparative timing Input	No voltage input (when earthing, no comparative output allowed)			
Displacement display	Sensor head: Measuring range display LED (RANGE)		Sensor head: Measuring range display LED (RANGE) Controller: LCD 3 digit display	
Gain selection	AUTO / LOW (switchable)			
Mutual interference prevention (Note 3)	Between 2 sets			
Operating voltage range	12 to 24 V DC $\pm 10\%$ $\pm 15\%$ including ripple 0.5 V (P-P)			
Current consumption (Sensor and controller set)	250 mA or less (at 12 V DC), 125 mA or less (at 24 V DC)			
Weight (including cable)	Net weight: 180 g approx.			

Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +20 °C **+68 °F**.

2) PNP output type is also available.

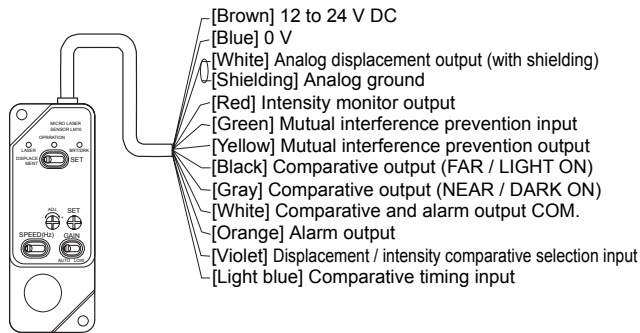
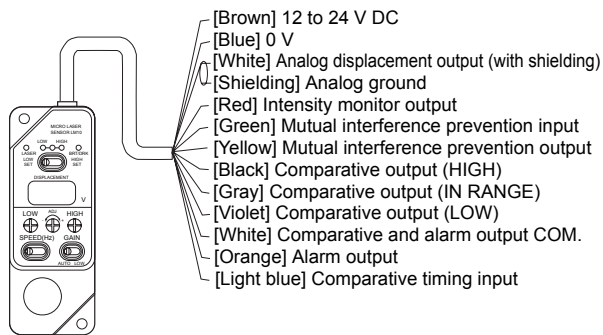
3) The value of the linearity characteristics, resolution and response time might get worse.

### Common

Insulation resistance (Initial)	Between external DC input and sensor metal parts (except for connector metal parts) 20 MΩ or more (at 500 V DC megger)
Voltage withstandability (Initial)	Between external DC input and sensor metal parts (except for connector metal parts) AC 500 V 1 min.
Vibration resistance (Screw installation)	10 to 55 Hz (1 cycle/min.) double amplitude of 1.5 mm <b>0.059 in</b> (controller: 0.75 mm <b>0.030 in</b> ), in X, Y and Z directions for two hours each
Shock resistance (Screw installation)	20 G or more, in X, Y and Z directions for three times each
Ambient temperature	0 to +50 °C <b>+32 to +122 °F</b> , Storage: –20 to +70 °C <b>–4 to +158 °F</b>
Ambient humidity	35 % to 85 % RH (No dew condensation)

Note: If there is no description for measurement conditions, the test is performed under operating voltage 24 V DC, ambient temperature +20 °C **+68 °F**, gain AUTO, response frequency 10 Hz, interference prevention OFF and white ceramics as a target at a measurement center distance.

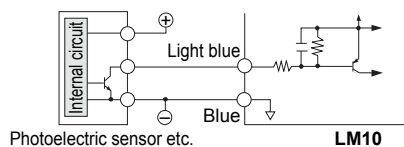


**I/O CIRCUIT AND WIRING DIAGRAMS****Wiring and functions****Single comparator type****Window comparator type****① Power input [brown (+) · blue (-)]**

- Input 12 to 24 V DC.

**② Comparative timing input [light blue]**

- While shorted to the 0 V (blue), comparative output is prevented. When using a transistor to establish the timing, use a transistor with a residual output voltage of 1.5 V or less during output.

**Comparative timing input connection example****③ Mutual interference prevention I/O [green (input), yellow (output)]**

- When using two sensors, you can set the mutual interference prevention mode by connecting the input wire of each to the output wire of the other. Be aware that this mode may adversely affect the linearity characteristics, resolution, and response.

**④ Analog displacement output [white, shielding (GND.)]**

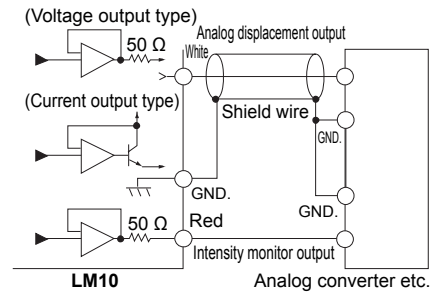
- An analog voltage / analog current (for each type separately) is output that corresponds to the displacement of the target within the measurement range. When the output selection switch is in the SET position, each comparative setting is outputted as voltage / current (for each type separately).

\* In case of window comparator type

In both the voltage output and current output types, the LCD display the voltage ( $\pm 5$  V/F.S.). Between the current output type's analog displacement output and the LCD display, there is a maximum 3 % of F.S. offset. Therefore, exercise caution when aligning the 0 setting the comparative values.

**⑤ Intensity monitor output [red, shielding (GND.)]**

- Analog voltage ( $-5$  V to  $+5$  V) is output corresponding to the amount of light reflected from the target. If the amount of light increases, the voltage value becomes larger and if it decreases, the voltage value becomes smaller.

**⑥ Alarm output [orange, white (COM.)]**

- Outputs during insufficient light (DARK) or too much light (BRIGHT).

**⑦ Comparative output****Single comparator type [black, gray, white (COM.)]**

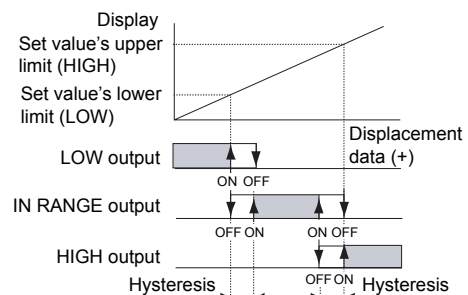
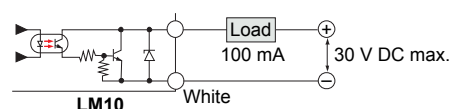
Displacement / intensity comparative selection input [Violet]	Comparing operations
When not connected	When displacement data is set value or over (far side): FAR / LIGHT ON output is ON. When displacement data is less than set value (near side): NEAR / DARK ON output is ON.
When connected to 0 V [blue]	When intensity data is set value or over (near side): FAR / LIGHT ON output is ON. When intensity data is less than set value (far side): NEAR / DARK ON output is ON.

Note: With the single comparator type, connecting the violet wire and blue wire changes from the analog displacement output to the light amount monitoring value output.

**Window comparator type [black, gray, violet, white (COM.)]**

Judgment result of analog displacement data is output.

LOW [violet]	Outputs when below the set value's lower limit.
IN RANGE [gray]	Outputs when between the set value's lower and upper limits.
HIGH [black]	Outputs when above the set value's upper limit.

**Description of comparative output operations****<Double comparator type>****<Alarm and comparative output connection example>**FIBER  
SENSORSLASER  
SENSORSPHOTO-  
ELECTRIC  
SENSORSMICRO  
PHOTO-  
ELECTRIC  
SENSORSAREA  
SENSORSSAFETY  
COMPONENTSPRESSURE  
SENSORSINDUCTIVE  
PROXIMITY  
SENSORSPARTICULAR  
USE  
SENSORSSENSOR  
OPTIONSWIRE-  
SAVING  
SYSTEMSMEASURE-  
MENT  
SENSORSSTATIC  
CONTROL  
DEVICESLASER  
MARKERSSelection  
GuideLaser  
Displacement

HL-C2

HL-C1

LM10

Magnetic  
Displacement

GP-X

GP-A

Collimated  
Beam Sensors

HL-T1

LA-300

LA

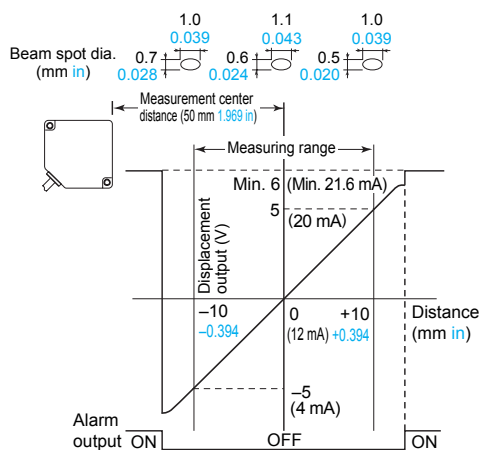
Other  
Products

## SENSING CHARACTERISTICS (TYPICAL)

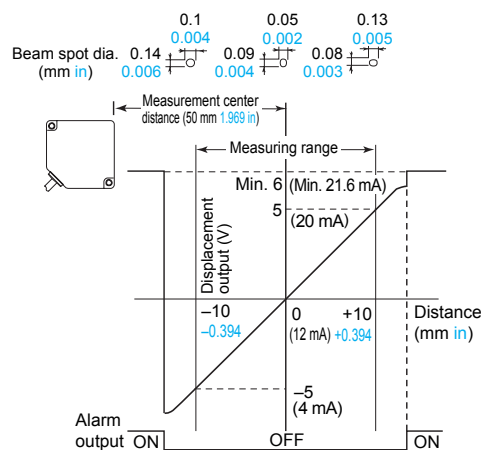
### Correlation between distance and output range characteristics

An analog voltage is output that corresponds to the displacement of the target within the measurable range. [( ): current output type]

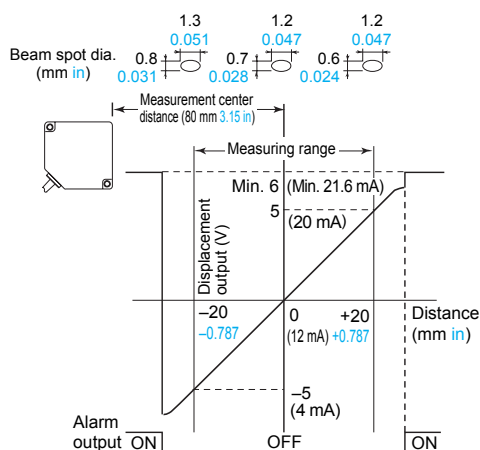
ANR1150 ANR11501 ANR1250 ANR12501



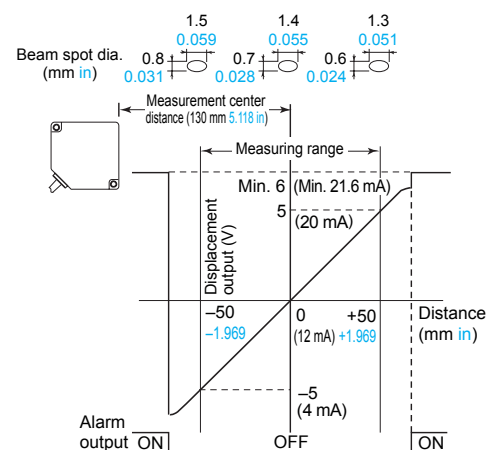
ANR1151 ANR11511 ANR1251 ANR12511



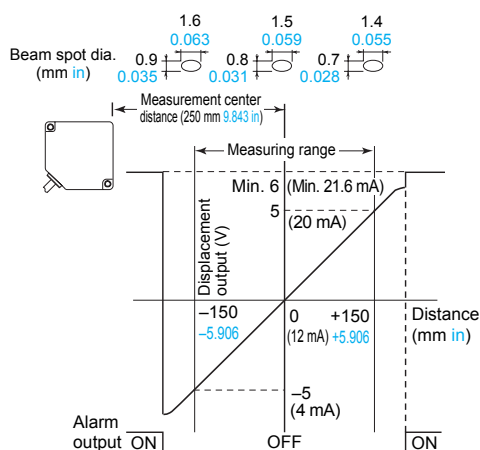
ANR1182 ANR11821 ANR1282 ANR12821



ANR1115 ANR11151 ANR1215 ANR12151



ANR1226 ANR12261



Selection Guide

Laser Displacement

HL-C2

HL-C1

**LM10**

Magnetic Displacement

GP-X

GP-A

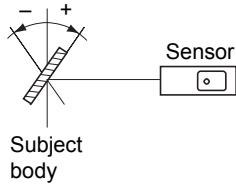
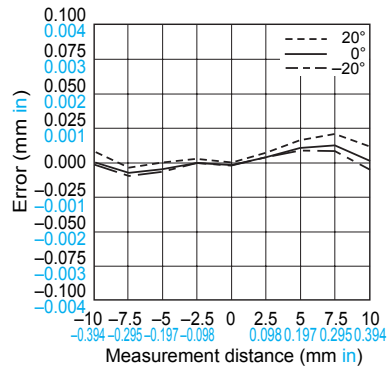
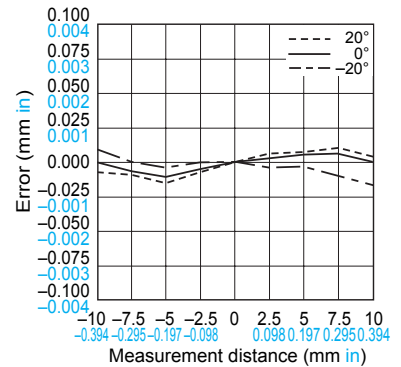
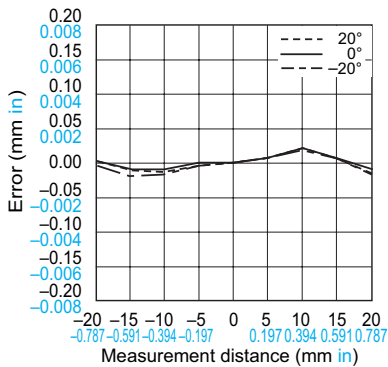
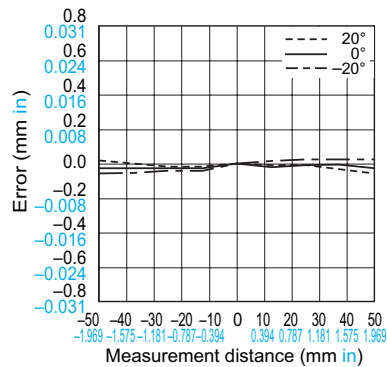
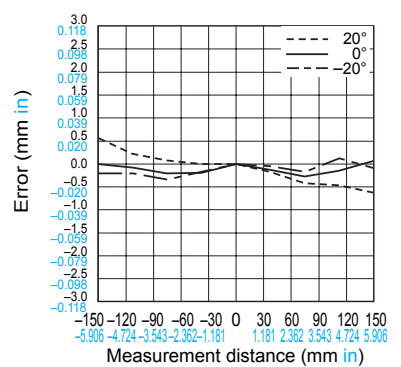
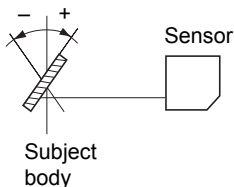
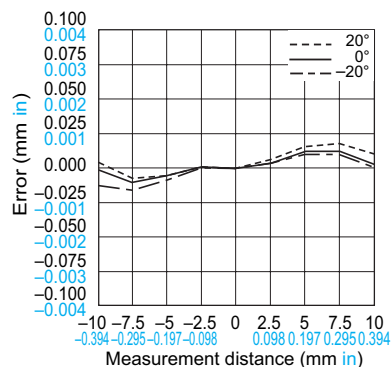
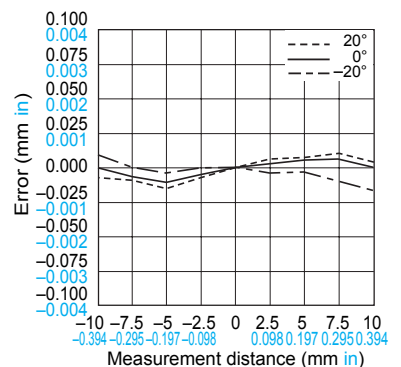
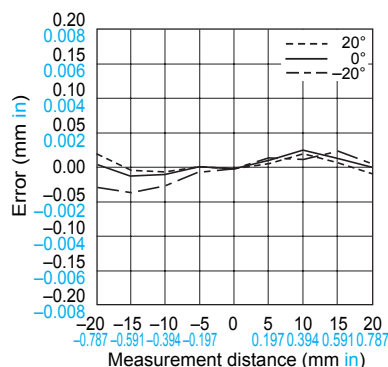
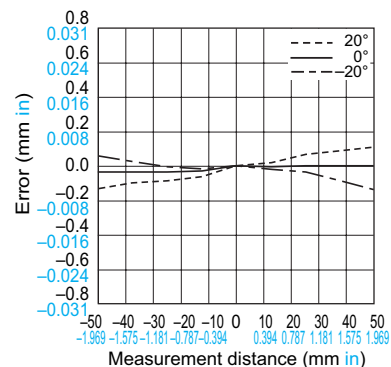
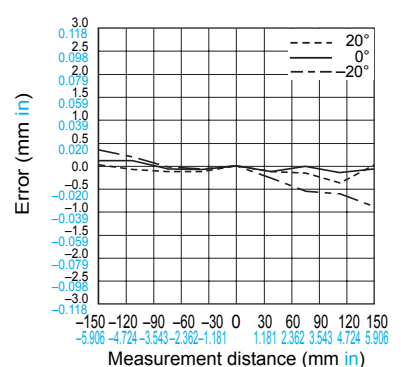
Collimated Beam Sensors

HL-T1

LA-300

LA

Other Products

**SENSING CHARACTERISTICS (TYPICAL)****Distance characteristics (Class 2 type sensor head)****White ceramic (0°, ±20°) vertical orientation****ANR1250 ANR12501****ANR1251 ANR12511****ANR1282 ANR12821****ANR1215 ANR12151****ANR1226 ANR12261****White ceramic (0°, ±20°) horizontal orientation****ANR1250 ANR12501****ANR1251 ANR12511****ANR1282 ANR12821****ANR1215 ANR12151****ANR1226 ANR12261**FIBER  
SENSORSLASER  
SENSORSPHOTO-  
ELECTRIC  
SENSORSMICRO  
PHOTO-  
ELECTRIC  
SENSORSAREA  
SENSORSSAFETY  
COMPONENTSPRESSURE  
SENSORSINDUCTIVE  
PROXIMITY  
SENSORSPARTICULAR  
USE  
SENSORSSENSOR  
OPTIONSWIRE-  
SAVING  
SYSTEMSMEASURE-  
MENT  
SENSORSSTATIC  
CONTROL  
DEVICESLASER  
MARKERSSelection  
GuideLaser  
Displacement**HL-C2****HL-C1****LM10**Magnetic  
Displacement**GP-X****GP-A**Collimated  
Beam Sensors**HL-T1****LA-300****LA**Other  
Products



## PRECAUTIONS FOR PROPER USE

Refer to p.1027 for general precautions and p.1025~ for laser beam.

- This catalog is a guide to select a suitable product. Be sure to read instruction manual attached to the product prior to its use.



- Never use this product as a sensing device for personnel protection.
- In case of using sensing devices for personnel protection, use products which meet laws and standards, such as OSHA, ANSI or IEC etc., for personnel protection applicable in each region or country.



- This product is classified as a Class 1 / Class 2 Laser Product in IEC / JIS standards and a Class II Laser Product in FDA regulations. Do not look at the laser beam directly or through optical system such as a lens.
- The following label is attached to the product. Handle the product according to the instruction given on the warning label.



(The English warning label based on FDA regulations is pasted on the FDA regulations conforming type.)

(The Japanese warning label is packed with the sensor head.)

### Safety standards for laser beam products

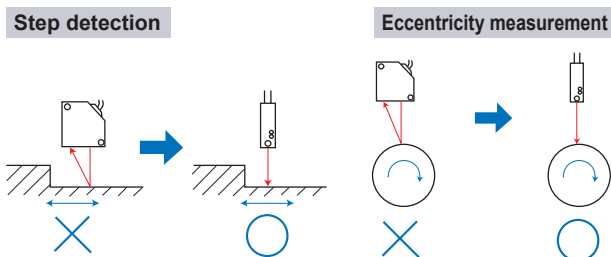
- A laser beam can harm human being's eyes, skin, etc., because of its high energy density. IEC has classified laser products according to the degree of hazard and the stipulated safety requirements. The **LM10** series is classified as Class 1 / Class 2 laser. (Refer to p.1025~ for laser beam.)

### Safe use of laser products

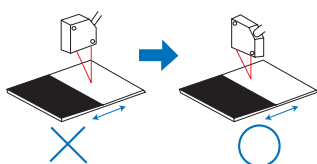
- For the purpose of preventing users from suffering injuries by laser products, IEC 60825-1: 2001 (Safety of laser products). Kindly check the standards before use. (Refer to p.1025~ for laser beam.)

### Procedure for setting the sensor head

- Be careful of the sensor head's orientation during mounting. When the subject body moves as shown below, errors will develop depending on the orientation of the sensor head. In order to minimize these errors, be sure to mount the sensor head in the correct orientation.



### Extremely different adjacent colors or materials



### Mounting the sensor head

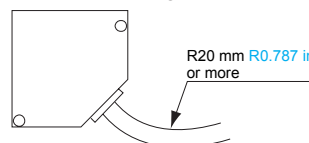
- Using the two mounting holes, firmly mount the sensor head so that the sensor head's front surface is parallel to the target. Do not tighten the installation screws to a torque over 2 N·m.

### Mounting the controller

- When mounting more than one controller in a row, **maintain at least 10 mm 0.394 in between each unit**. Also, when mounting the controller inside control panels or other areas where the air is not properly ventilated, the controller will cause the ambient temperature to rise. In these cases, **ensure the proper cooling facilities**.

### Cable

- When the sensor head and controller are fixed and cables connected, **do not subject the cables to a pull of more than 3 kg. Have no bends in the cables with a radius of less than 20 mm 0.787 in. Also, do not bend a sensor head's cable near where the cable is attached to the sensor head.**
- When the sensor head is to be moved while in use, do not have it so that the sensor head's cable becomes bent. If the location is such that it cannot be helped, we recommend purchasing the appropriate length extension cable (ANR12□).



### Noise precautions

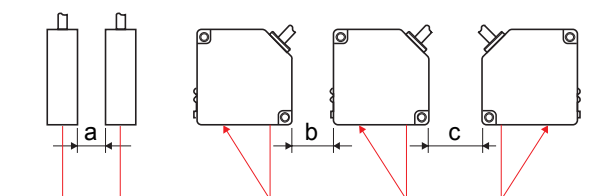
- The connector's metal portion is internally connected to the analog output GND. In order to prevent affects from noise or damage to the internal circuits, be sure to insulate the metal portion with electrical tape or other means.
- **Mount the unit as far away as possible from high voltage lines, power lines, or devices that generate large switching surges.**
- Separate the sensor head cable wiring, high voltage circuit, and power circuit.
- If there is much noise on the power supply, it will affect the analog output. In such cases, use a noise filter or noise-cut transformer.

### Insulation resistance and voltage withstandability

- Do not perform insulation resistance or withstand voltage tests between the connector's metal portions and input / outputs.

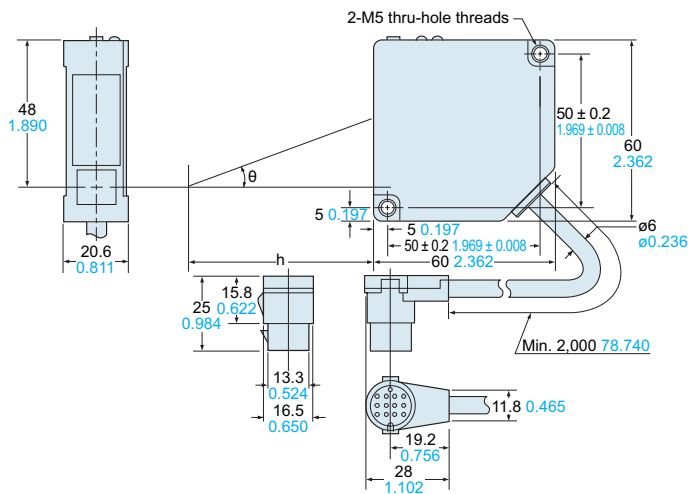
### Area of interference

- When using more than one sensor together, be careful of the area of interference.

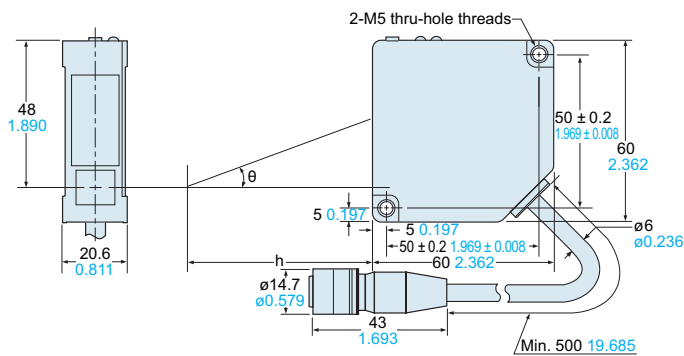
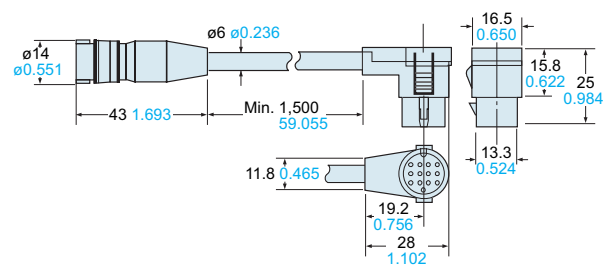
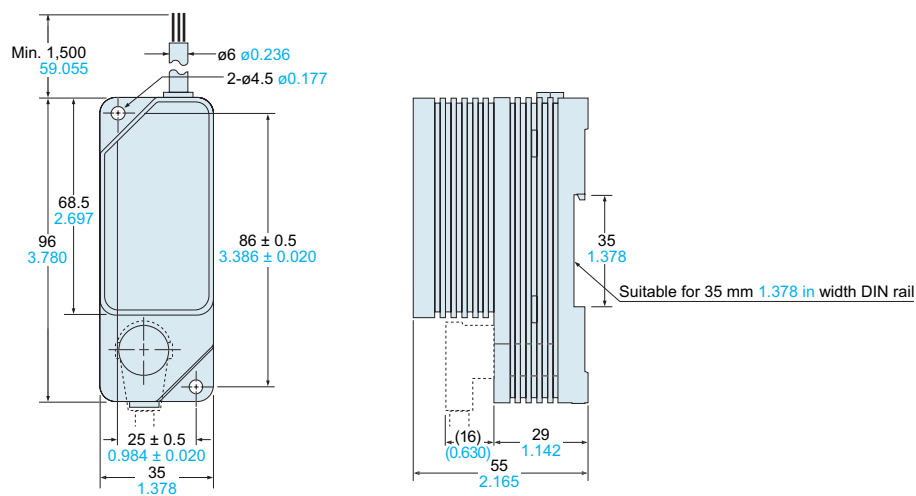


Units: mm in

Sensor head model No.	a	b	c
ANR1150, ANR11501	40 1.575	20 0.787	70 2.756
ANR1151, ANR11511			
ANR1182, ANR11821	50 1.969	60 2.362	110 4.331
ANR1115, ANR11151	80 3.150	100 3.937	150 5.906
ANR1250, ANR12501			
ANR1251, ANR12511	50 1.969	40 1.575	90 3.543
ANR1282, ANR12821	80 3.150	80 3.150	130 5.118
ANR1215, ANR12151	120 4.724	140 5.512	190 7.748
ANR1226, ANR12261	210 8.268	350 13.780	400 15.748

**DIMENSIONS (Unit: mm in)**The CAD data in the dimensions can be downloaded from the SUNX website: <http://www.sunx.com>**ANR11□****Sensor head**

Model No.	Mark	h	θ
ANR1□5□, ANR1□5□1		50 mm 1.969 in	20°
ANR1□82, ANR1□821		80 mm 3.150 in	16°
ANR1□15, ANR1□151		130 mm 5.118 in	11°
ANR1226, ANR12261		250 mm 9.843 in	5.8°

**ANR12□****Sensor head****ANR81□ Intermediate cable for ANR12□ (Accessory for sensor head)****ANR5□****Controller**FIBER  
SENSORSLASER  
SENSORSPHOTO-  
ELECTRIC  
SENSORSMICRO  
PHOTO-  
ELECTRIC  
SENSORSAREA  
SENSORSSAFETY  
COMPONENTSPRESSURE  
SENSORSINDUCTIVE  
PROXIMITY  
SENSORSPARTICULAR  
USE  
SENSORSSENSOR  
OPTIONSWIRE-  
SAVING  
SYSTEMSMEASURE-  
MENT  
SENSORSSTATIC  
CONTROL  
DEVICESLASER  
MARKERSSelection  
GuideLaser  
Displacement**HL-C2****HL-C1****LM10**Magnetic  
Displacement**GP-X****GP-A**Collimated  
Beam Sensors**HL-T1****LA-300****LA**Other  
Products